

Claims

- [c1] 1. A device, comprising:
 - a resistor;
 - a heater disposed proximate to the resistor and capable of raising the temperature of the resistor;
 - a dielectric disposed between the heater and the resistor; and
 - a tuner electrically coupled to the resistor, wherein the heater adjusts the resistance of the resistor in response to the tuner.
- [c2] 2. The device of claim 1, further comprising:
 - a heater driver circuit electrically coupled to the heater and to the tuner, wherein the heater driver circuit supplies a heating current to the heater.
- [c3] 3. The device of claim 2, wherein:
 - the tuner transmits an output signal to the heater driver circuit when the temperature of the resistor is outside a nominal temperature range.
- [c4] 4. The device of claim 1, wherein:
 - the resistor, the heater, and the tuner are disposed on a semiconductor wafer.

- [c5] 5. The device of claim 1, wherein:
 - the resistor, the heater and the dielectric are at least partially disposed within a dielectric material.
- [c6] 6. The device of claim 5, wherein:
 - the thermal conductivity of the dielectric is higher than that of the dielectric material.
- [c7] 7. The device of claim 5, wherein:
 - the dielectric material substantially encases the resistor, the heater and the dielectric.
- [c8] 8. The device of claim 5, wherein the heater maintains the resistor at an elevated temperature while the resistor is in use.
- [c9] 9. The device of claim 5, further comprising:
 - one or more conductors extending through the dielectric material and contacting the resistor, wherein the conductors couple the resistor to the tuner.
- [c10] 10. A semiconductor chip comprising the device recited in claim 1.
- [c11] 11. A method of operating a resistor, comprising:
 - providing a resistor;
 - providing a tuner that is electrically coupled to the resistor;

detecting a resistance of the resistor; and
adjusting the temperature of the resistor when the
resistance of the resistor is outside a nominal resis-
tance range.

- [c12] 12. The method of claim 11, further comprising:
 - providing a heater capable of raising the temperature of the resistor; and
 - providing a dielectric disposed between the heater and the resistor, wherein
 - adjusting the temperature of the resistor comprises adjusting the temperature of the heater.
- [c13] 13. The method of claim 12, further comprising:
 - providing a dielectric material, wherein
 - the resistor, the heater and the dielectric are at least partially disposed within the dielectric material, and
 - wherein
 - the thermal conductivity of the dielectric is higher than that of the dielectric material.
- [c14] 14. The method of claim 11, adjusting the temperature of the resistor comprises:
 - passing a DC current through the resistor.
- [c15] 15. A method of making a device, comprising:
 - providing a first dielectric material;

forming a heater over the first dielectric material;
forming a dielectric over the heater;
forming a resistor over the dielectric; and
electrically coupling the resistor to a tuner, wherein
the heater is arranged to adjust the resistance of
the resistor in response to the tuner.

- [c16] 16. The method of claim 15, further comprising:
providing a heater driver circuit; and
electrically coupling the heater driver circuit to the
heater and to the tuner, wherein the heater driver
circuit is arranged to supply a heating current to the
heater.
- [c17] 17. The method of claim 15, wherein:
the resistor, the heater, and the tuner are formed on
a semiconductor wafer.
- [c18] 18. The method of claim 15, further comprising:
at least partially encasing the resistor, the heater and
the dielectric within a dielectric material.
- [c19] 19. The method of claim 18, wherein:
the thermal conductivity of the dielectric is higher
than that of the dielectric material.
- [c20] 20. The method of claim 15, further comprising:
blowing one or more fuses so that a constant heating

current flows through the heater.